

Appendix A

Clean Version of Replacement Paragraph/Section/Claim with
Instructions for Entry

Please amend the application as follows:

In the Claims:

Please amend the claims as shown in the following numbered paragraphs.

Sub
C1

A1

1. (Amended) A wavefront transformer suitable for transforming an incident electromagnetic wavefront having a given shape to a reflected wavefront having a different shape, comprising: a substrate having a conductive surface for reflecting the incident electromagnetic energy, and a plurality of openings in the conductive surface, each opening formed by a respective one of a plurality of discrete cavities extending from the conductive surface and having a flat bottom surface, each cavity having a selected position on the conductive surface with respect to the focal point to induce a propagation phase shift over the distance to the focal point, each cavity inducing a local phase shift in the reflected electromagnetic energy as a function of a selected dimension of the cavity, the combined propagation phase shift and local phase shift from the plurality of cavities places the reflected electromagnetic energy in phase at the focal point.

C1
A2

4. (Amended) A wavefront transformer as set forth in claim 2, wherein the plate includes a first plate overlying a second plate, wherein the first plate has a plurality of through-holes therein that form the cavities and the second plate forms the flat bottom surface of the cavities.

C1
A3

10. (Amended) A wavefront transformer suitable for transforming an incident electromagnetic wavefront having a given shape to a reflected wavefront having a

C1 different shape, comprising: a substrate having a conductive surface for reflecting the incident electromagnetic energy, and a plurality of openings in the conductive surface, each opening formed by a respective one of a plurality of discrete cavities extending from the conductive surface, each cavity having a selected position on the conductive surface with respect to the focal point to induce a propagation phase shift over the distance to the focal point, each cavity inducing a local phase shift in the reflected electromagnetic energy as a function of a selected dimension of the cavity, the combined propagation phase shift and local phase shift from the plurality of cavities places the reflected electromagnetic energy in phase at the focal point, wherein only the positions of the cavities and the selected dimension of the cavities varies, the dimension of each cavity is selected such that the total phase shift at the focal point of an electromagnetic wave reflected from each cavity is equal, so that

$$\phi(r) = \phi(0) + \frac{2\pi}{\lambda} (\sqrt{r^2 + f^2} - f),$$

where r is the distance of the cavity from a reference point in the plane of the conductive surface, $\phi(r)$ is the local phase shift imposed on an incident electromagnetic wave at r by the flat reflecting surface, f is the focal length of the reflector, λ is a desired wavelength of the reflected electromagnetic energy, and $\phi(0)$ is the local phase shift imposed on an incident electromagnetic wave by a cavity at the reference point having a dimension $a(0,0)$.

C1 30. (Amended) An antenna suitable for focusing incident electromagnetic energy at an operating wavelength on a focal point, comprising: a geometrically flat wavefront transformer plate having a conductive surface and a waveguide feed positioned at the focal point suitable to receive the reflected electromagnetic energy; the wavefront transformer plate further includes a plurality of discrete cavities opening in the conductive surface and having a flat bottom surface, the dimensions of each

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enc

cavity varying as a function of the position of the cavity on the plate with respect to the focal point to induce a local phase shift on the incident wave of electromagnetic energy as the electromagnetic energy is reflected, the cavities being spaced with respect to adjacent cavities to enable the wavefront transformer plate to focus the reflected electromagnetic energy at the focal point such that electromagnetic energy reflected from the wavefront transformer plate is in phase at the focal point.

C1
H5

32. (Amended) A reflector suitable for focusing incident electromagnetic energy at an operating wavelength on a focal point, comprising: means for focusing an incident plane wave of any polarization at the focal point using constructive interference that includes a substrate having a conductive surface for reflecting incident electromagnetic energy, and a plurality of closed-end cavities having openings in the conductive surface.

33. (Amended) A reflector as set forth in claim 32, wherein each cavity forms part of at least one equilateral-triangular arrangement of cavities.
